

CLAIMS

1. An ontology-driven information system, comprising:
 - a plurality of models, each of the plurality of models expressing an aspect of a business domain using concepts and relationships between concepts; and
 - an ontology in communication with each of the plurality of models, the ontology providing uniform definitions for the concepts and relationships between concepts used in the plurality of models.
2. An ontology-driven information system as recited in claim 1, wherein the use of the uniform definitions in the plurality of models avoids redundancy in the models, provides consistency between the models, and enables the plurality of models to provide an overall model of the business domain that is more expressive than an overall model based on a plurality of models that does not use uniform definitions.
3. An ontology-driven information system as recited in claim 1, wherein the uniform definitions in the ontology can be changed on the fly by a business manager.
4. An ontology-driven information system as recited in claim 1, further comprising:
 - a reasoning engine that reaches a conclusion based on a model of a domain and an inference procedure; and
 - a knowledge manager for storing and manipulating the ontology.

5. An ontology-driven information system as recited in claim 4, further comprising:

a user and application interface for providing an interface for users and applications; and

a distributed information service for accessing disparate, distributed data sources.

6. A method for executing an interaction flow model, comprising:

receiving an event;

categorizing the received event;

identifying a situation that matches the categorized received event; and

executing one or more tasks for the situation, the execution of the one or more tasks including one of an interpretation of a model and execution of a method of an object.

7. A method for executing an interaction flow model as recited in claim 6, wherein the receiving the event is by way of one of a distributed information service and a user and application interface.

8. A method for executing an interaction flow model as recited in claim 6, wherein the categorizing is configured to generate a set of categories for previously handled events.

9. A method for executing an interaction flow model as recited in claim 6, wherein the executing one or more tasks for the situation includes:

invoking one of an optimization engine, an inference engine, and a constraint satisfaction engine to interpret the model, the model including one of a rule base model, an optimization model, and a constraint model;

wherein the interpretation of the model can include one of an infer action, a search with constraints action, an interact action, an optimize action, and a decide action.

10. A method for executing an interaction flow model as recited in claim 9, wherein the interpretation of the rule base model includes executing the inference engine to act upon the rule base model and produce a number of constraints.

11. A method for executing an interaction flow model as recited in claim 10, wherein the number of constraints are communicated to the constraint satisfaction engine, the constraint satisfaction engine being configured to search for a set of objects that match the number of constraints as well as constraints of the constraint model.

12. A method for executing an interaction flow model as recited in claim 11, wherein the set of objects are communicated to the optimization engine, the optimization engine communicating with the optimization model so as to produce an optimized object that is recorded, the recording of the optimized object being indicative of the handling of the identified situation.

13. An information system, comprising:

a user and application interface;

a reasoning engine in communication with the user and application interface;

a knowledge manager in communication with the user and application interface and interfaced with the reasoning engine; and

a distributed information service in communication with the reasoning engine, the knowledge manager, and the user and application interface;

wherein the reasoning engine is configured to work in conjunction with the knowledge manager so as to enable the reasoning engine to handle events by executing one or more specific tasks prescribed by the knowledge manager to handle the events most appropriately.

14. An information system as recited in claim 13, wherein the knowledge manager includes an interaction flow model that is a repository for abstract situations to handle the events received by the reasoning engine, the situations defining the one or more tasks that are to be executed by the reasoning engine.

15. An information system as recited in claim 14, wherein the reasoning engine includes an interaction flow engine that is configured to receive the events, to invoke a categorization engine to categorize the events, and to interface with the interaction flow model of the knowledge manager.

16. An information system as recited in claim 15, wherein the interaction flow engine is configured to process through the one or more tasks by invoking at least one of an inference engine, a constraint satisfaction engine, an optimization engine, and an external application.

17. An information system as recited in claim 16, wherein the inference engine of the reasoning engine executes the event in conjunction with rules obtained from a rule base model of the knowledge manager to generate a number of constraints that are communicated to the interaction flow engine of the reasoning engine.

18. An information system as recited in claim 16, wherein the constraint satisfaction engine executes at least one of each of constraints received from the interaction flow engine and constraints obtained from the constraint model, the constraint satisfaction engine being configured to produce a set of solutions.

19. An information system as recited in claim 16, wherein the optimization engine is configured to receive the set of solutions from the interaction flow engine and optimization model data to generate an optimized solution, the optimized solution being communicated to the distribution information service.

20. An information system as recited in claim 19, wherein the optimized solution is recorded.

21. An information system as recited in claim 13, wherein the reasoning engine includes:

- an interaction flow engine;
- an inference engine;
- a constraint satisfaction engine;
- an optimization engine;

a categorization engine; and

a data mining engine;

wherein the interaction flow engine is in communication with the categorization engine, the inference engine, the constraint satisfaction engine and the optimization engine, the interaction flow engine being configured to invoke one or more of the categorization engine, the inference engine, the constraint satisfaction engine and the optimization engine to generate recommendations based on a profile of a user, rules obtained from the knowledge manager, constraints obtained from the knowledge manager, and an ontology.

22. An information system as recited in claim 21, wherein the profile includes interests of a user and wherein the constraints include business expertise and goals of the user.

23. An information system as recited in claim 21, wherein the interaction flow engine is configured to specify reasons regarding the generated recommendations, such reasons including identifying feedback received from the user, the optimization models used to generate the recommendations, and the rules used to generate the recommendations.

24. An information system as recited in claim 21, wherein the interaction flow engine implements an interaction flow model of the knowledge manager to drive the generated recommendation.

25. An information system as recited in claim 21, wherein the knowledge manager includes:

an interaction flow model;

a rule base model;
a constraint model;
an optimization model;
a conceptual model;
a predictive model; and
an ontology.

26. An information system as recited in claim 25, wherein each of the interactive flow model and the ontology is in communication with the rule base model, the constraint model, and the optimization model, wherein the interactive flow model is configured to manage interaction flows with each of the rule base model, the constraint model, and the optimization model, and wherein interaction flows include a number of situations and each situation has a context description that contains event concepts that a situation of the number of situations requires to occur.

27. An information system as recited in claim 26, wherein the interaction flow model is configured to be compiled for execution by the interaction flow engine.

28. An information system as recited in claim 27, wherein the ontology defines a meaning of terms used by the interaction flow model.

29. An information system, comprising:

a reasoning engine configured to derive a set of conclusions using a set of premises and to execute actions that are attached to the set of conclusions, wherein a plurality of models encode the set of premises; and

a knowledge manager, the knowledge manager being a repository of the plurality of models, each of the plurality of models defining situations that occur in decision making to achieve a goal state, and the knowledge manager including an ontology to provide consistency between the plurality of models.

30. An information system as recited in claim 29, further comprising:

a distributed information service in communication with each of the reasoning engine and the knowledge manager, the distributed information service being configured to provide a link to external modules and external applications to the reasoning engine and the knowledge manager without requiring direct access to disparate information sources handled by the reasoning engine and the knowledge manager.

31. An information system as recited in claim 30, wherein each of the disparate information sources is accessed using a uniform resource identifier (URI), which is a logical name that hides a location and an access protocol of each of the disparate information sources.

32. An information system as recited in claim 30, further comprising:

a user and application interface in communication with the distributed information service, the knowledge manager, and the reasoning engine, the user and application interface being configured to provide an interface to external actors, wherein external actors include one of human users and applications.

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33. An information system as recited in claim 32, wherein the user and application interface includes a system administration interface, an application deployment interface, a business modeling interface, an application object system, and a delivery channel interface.

34. An information system as recited in claim 30, wherein the distributed information service includes a data model, a query service, a naming service, a storage system, a schema manager, and a mapping service.

35. An information system as recited in claim 34, wherein the storage system includes resource adapters.

36. A computer readable media having program instructions for executing an interaction flow model, comprising:

program instructions for receiving an event;

program instructions for categorizing the received event;

program instructions for identifying a situation that matches the categorized received event; and

program instructions for executing one or more tasks for the situation, the execution of the one or more tasks including one of an interpretation of a model and execution of a method of an object.

37. A method for executing an interaction flow model as recited in claim 36, wherein receiving the event is by way of one of the distributed information service and the user and application interface.

38. A method for executing an interaction flow model as recited in claim 36, wherein the categorizing is configured to generate a set of categories for previously handled events.

39. A method for executing an interaction flow model as recited in claim 36, wherein the executing one or more tasks for the situation includes:

program instructions for invoking one of an optimization engine, an inference engine, and a constraint satisfaction engine to interpret the model, the model including one of a rule base model, an optimization model, and a constraint model;

wherein the interpretation of the model can include one of an infer action, a search with constraints action, an interact action, an optimize action, and a decide action.

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